Michigan Educational Assessment Program

Science Grade 8
Scoring Guide for
Released Item 42
Chemical Change
Fall 2007

MICHIGAN Department of Education

ANSWER THE FOLLOWING CONSTRUCTED-RESPONSE ITEM IN YOUR ANSWER DOCUMENT.

42 Constructed Response (3 points)

- List the steps of a procedure the student groups could use to demonstrate a chemical change in the paper using the supplies provided.
- Describe one observation students could make about a chemical change that is different from an observation about a physical change.

NOTHING WRITTEN IN THIS TEST BOOKLET WILL BE SCORED.

Science Rubric for Chemical Change

Scoring Guide:

Bullet 1: (0 to 2 points)
2 points:
Identifies 2 or more necessary procedural steps used to produce a chemical change in the paper (i.e. index card)

1 point:
Identifies 1 necessary procedural step used to produce a chemical change in the paper (i.e. index card):

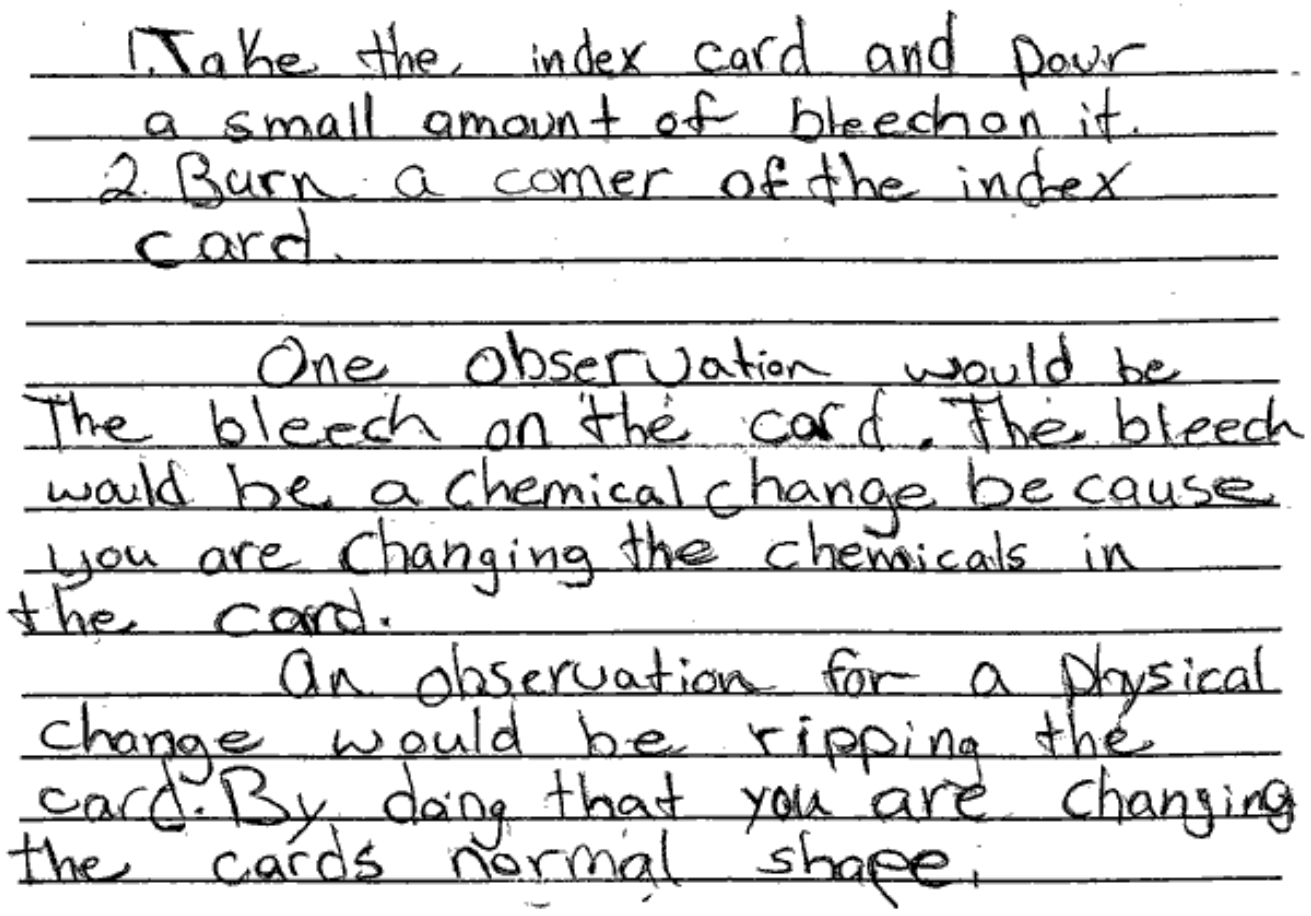
- Burn the index card
- Bleach the card
- Other possible procedural steps used to produce a chemical change in the paper (i.e. index card)

Bullet 2: (0 to 1 points)

- Describes an observation showing evidence of a chemical change (e.g., paper gives off gases and leaves an ash, both chemically different from the index card; bleach reacts with the dye and changes color of the index card, whereas color is an attribute of different compounds)
- Provides an appropriate explanation of a chemical change

Note: If the student misidentifies a physical or chemical change anywhere in the response, no credit is given in Bullet 2.

Anchor Paper 1 – Score Point 3


1. Take the index card and pour a small amount of bleech on it.
2. Burn a comer of the index card.

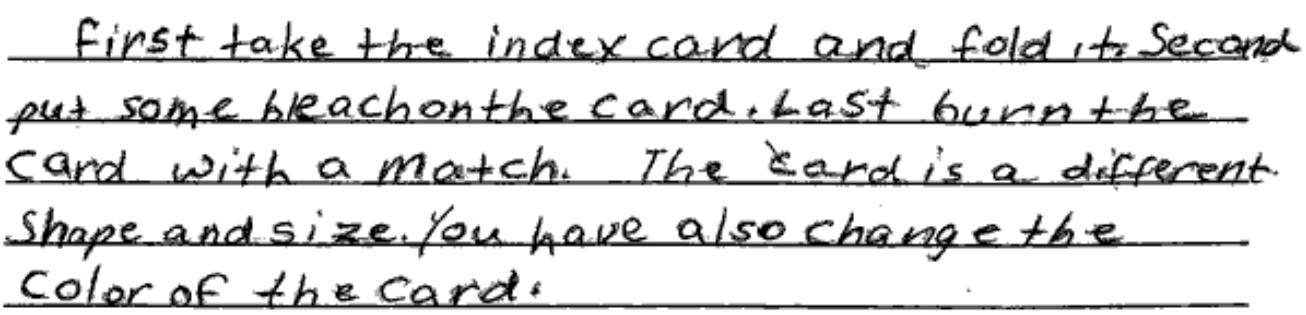
One observation would be The bleech on the card. The bleech would be a chemical change be cause you are changing the chemicals in the card.

An observation for a physical change would be ripping the card. By doing that you are changing the cards normal shape.

Anchor Paper 1
Score Point 3

The student lists 2 acceptable procedural steps used to produce a chemical change in the index card *(1. Take the index card and pour a small amount of bleech on it; 2. Burn a corner of the index card).* The student correctly describes one observation about a chemical change that is different from a physical change *(One observation would be The bleech on the card. The bleech would be a chemical change because you are changing the chemicals in the card).* "Changing the chemicals in the card" is a correct explanation of a chemical change, indicating understanding that during a chemical change there is a chemical reaction – a substance changes chemically, is transformed, or becomes a new substance.
Note: This response also includes an observation about physical changes *(ripping the card. By doing that you are changing the cards normal shape).* This extraneous information about physical changes is ignored as it is a correct statement and does not contradict the correct observation provided for a chemical change.

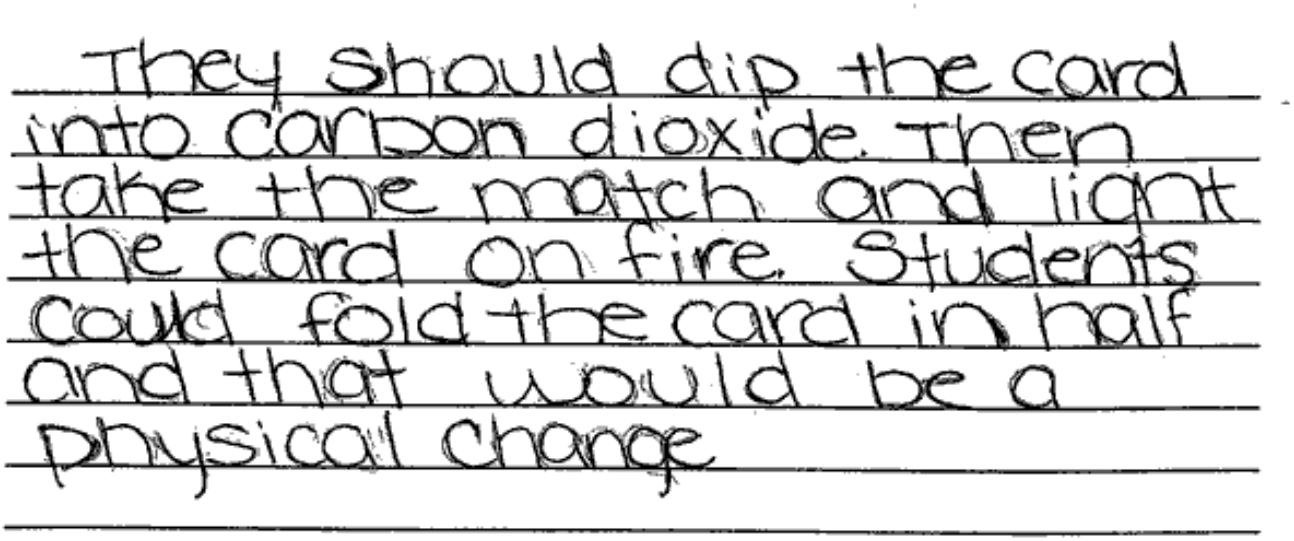
Anchor Paper 2 – Score Point 2



Anchor Paper 2
Score Point 2

The student lists more than 2 acceptable procedural steps used to produce a chemical change in the index card *(First take the index card and fold it; Second put some bleach on the card; Last burn the card with a match).* The student incorrectly describes one observation about a chemical change that is different from a physical change *(The card is a different shape and size. You have also change the color of the card).* Although the response does state a correct observation of a chemical change *(change the color of the card),* it also includes an observation of a physical change *(The card is a different shape and size).* The response does not clarify "different shape and size" as a physical change, so it must be assumed from the prompt that the student is only referring to observations of a chemical change and has misidentified a physical change as a chemical change. Per the Rubric Note, if a response misidentifies a physical or chemical change anywhere in the response, no credit is given for Bullet 2 (it is not clear the student understands the difference between a chemical and physical change).
Note for Bullet 1: Although "folding the card" would be a procedural step used to produce a physical change rather than a chemical change, in this response it is clear that the paper being folded is an acceptable procedural step leading to bleaching. Compare to Anchor Paper A5.

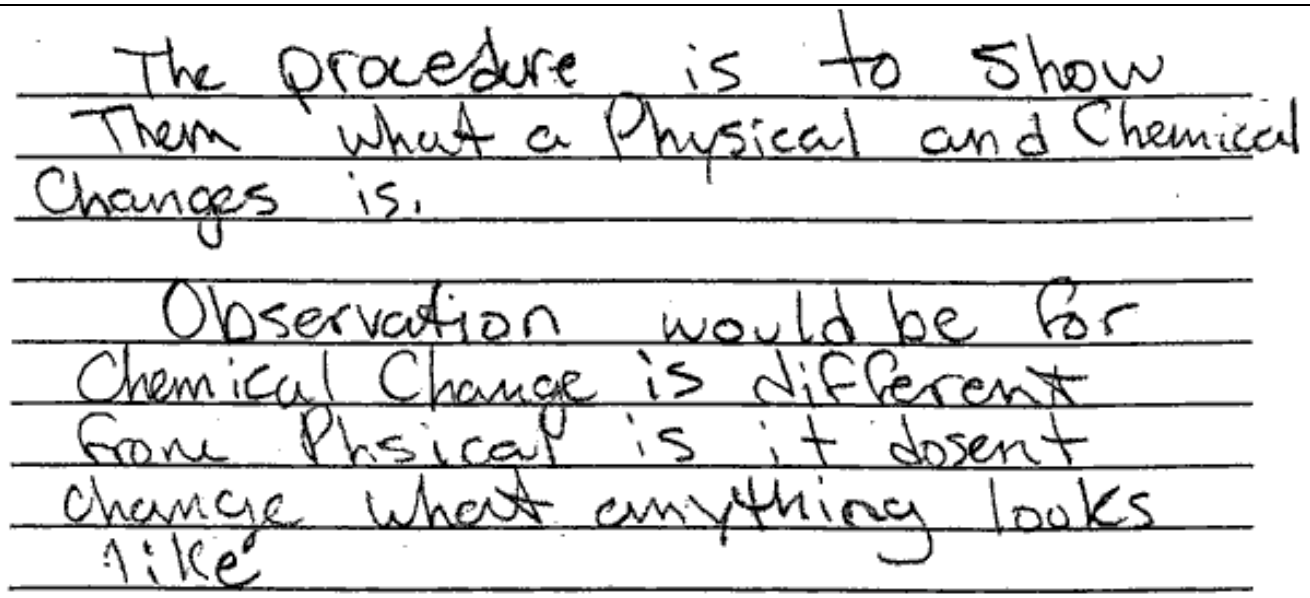
Anchor Paper 3 – Score Point 1



Anchor Paper 3
Score Point 1

The student lists 1 procedural step used to produce a chemical change in the index card *(take the match and light the card on fire).* "Students could fold the card in half and that would be a physical change," extraneous information about physical changes, is ignored as it is a correct statement and does not contradict credit given. The student does not describe one observation about a chemical change that is different from a physical change, so Bullet 2 receives no credit.
Note for Bullet 1:"They should dip the card into carbon dioxide," does not receive credit, as carbon dioxide is not used in this experiment and if substituted for bleach would change the experiment. Stating "acid" for "bleach" would also be unacceptable, as using acid would change the experiment. Using a Bunsen burner or gasoline instead of a match would be ignored as neither would change the outcome of the experiment.

Anchor Paper 4 – Score Point 0


The procedure is to show Them what a Physical and Chemical Changes is.

Observation would be for Chemical Change is different from Phsical is it dosent change what anything looks like

Anchor Paper 4
Score Point 0

The student does not address the task of listing procedural steps used to produce a chemical change in the index card *(The procedure is to show Them what a Physical and Chemical Changes is).* The student does not provide a correct observation about a chemical change that is different from a physical change *(Observation would be for Chemical Change is different from Phsical is it dosent change what anything looks like).* This response states that chemical changes do not change what things look like, which is an incorrect statement. Applying bleach to an index card will change the color of the index card, demonstrating a chemical change.